SHALLOW WATER EFFECT ON SPEED

From time to time I've needed to do speed predictions for a course that takes me through shallow water. Over the years I have come across various rules that involve length of boat versus depth and other formulae. None ever seemed quite right to me.

The other day as I was looking up various sources on the subject, I came across some interesting data that seemed to relate the shallow water effect only to speed vs. depth. No consideration to vessel length is given - except, the vessel *must* remain in displacement mode, not planing.

The data I found only covered a few points. I determined those points fit a logarithmic curve and developed a formula for the progression. I was then was able to create an entire set of data points by interpolation and extrapolation.

This only works for the "normal" hull form and recall that it must be in displacement. The theoretical maximum displacement speed of a hull in knots is 1.34 times the square root of the waterline length in feet. So obviously my 12' dinghy doing 10 knots would not be considered displacement. Planing boats will not be slowed but rather will speed up. Something I'm not addressing here.

The data seems reasonable and the few people I've shown it to who are familiar with shallow water slowdown say it appears to be correct to them. I'd very much appreciate your comments as to how this compares with any empirical or other data you might have. The usual caveats apply. This data is unproven. Use it for verification purposes only. Your mileage may vary.

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Only for vessels operating at displacement speed

SPEED kts	6	7	8	9	10	11	12	13
DEPTH ft								
5	4.0	9.0						
6	2.4	5.4	12.0		Possible			
7	1.7	3.6	7.5					
8	1.3	2.6	5.0	10.5		Planing		
9	1.0	1.9	3.6	7.0	13.5			
10	0.8	1.5	2.8	5.4	9.9		Region	
11	0.7	1.3	2.3	4.2	7.5	13.5		
12	0.6	1.0	1.9	3.2	5.8	9.9		
13	0.5	0.9	1.5	2.6	4.4	8.0	13.5	
14	0.5	0.8	1.3	2.1	3.6	6.2	10.5	
15	0.4	0.7	1.1	1.9	3.2	5.0	8.6	14.0
16	0.4	0.6	1.0	1.7	2.6	4.4	7.0	12.0
17	0.3	0.5	0.9	1.4	8.5	3.6	5.8	9.9
18	0.3	0.5	0.8	1.3	7.5	3.2	5.0	8.0
19	0.3	0.4	0.8	1.1	1.7	2.8	4.4	7.0
20	0.3	0.4	0.7	1.0	1.5	2.4	4.0	5.8

SPEED LOSS – percent

Tom Collins - June 2012